

**Remarks**

1. Applicant is disappointed that, despite the period of time that has elapsed since Applicant filed its response of February 18<sup>th</sup>, 2005 to the first Office Action and despite the detailed and expansive arguments put forward by Applicant traversing the original rejection of claims 1, 2, 4, 6 to 14, 16, 19 to 21, 23 to 27 and 29 as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of DiToro (US4058713), the Examiner has issued a final Office Action repeating essentially the same ground of rejection but including a "Response to Arguments" section that amounts to one short paragraph that clearly demonstrates that Applicant's arguments have not been fully considered.

2. Applicant reminds the Examiner that in *ex parte* examination of patent applications, the Patent and Trademark Office bears the burden of establishing a *prima facie* case of obviousness. MPEP § 2142; *In re Fritch*, 972 F.2d 1260, 1262, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992). The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention is always upon the Patent and Trademark Office. MPEP § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Plasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984). Only when a *prima facie* case of obviousness is established does the burden shift to the applicant to produce evidence of nonobviousness. MPEP § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). If the Patent and Trademark Office does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of a patent. *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Grabiak*, 769 F.2d 729, 733, 226 U.S.P.Q. 870, 873 (Fed. Cir. 1985). A *prima facie* case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. *In re*

*Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. MPEP § 2142.

3. Merely pointing to the fact that the feature comprising the main amendment included in the independent claims of Applicant's first response can be found in one of the pieces of applied prior art (in this case AAPA) does not meet the burden incumbent on the USPTO, as established by law, of supporting a rejection under 35 U.S.C. §103(a). It is necessary that each claim is considered as a whole and the tests set out in section 2 of this paper are applied thereto. It is also necessary that the conclusions drawn from the application of said tests to each claim is explained to the Applicant by way of demonstrating that the Applicant's arguments have been fully considered but are not persuasive. That has not occurred here.

4. Applicant maintains as entirely pertinent the contents of its response of February 18, 2005 and requests that said response now be given proper consideration. For example, the Examiner has not explained why a skilled person would be motivated to apply the technique of space time coding (STC) and, in particular, space time transmit diversity (STTD), which was originally designed for mitigating the effects of fading and coloring of a non-dispersive communications channel (present application, page 2, line 30 to page 3, line 3) to the dispersive communication system of DiToro. Or, even if the skilled person did for some reason become motivated to try applying the STC technique to DiToro, why he/she would

then consider going against the teaching of DiToro by removing one of the essential elements of the system of DiToro in order to arrive at the present invention. It should also not be lost on the Examiner that the STC technique was first mooted in 1998 for non-dispersive systems and, if the Examiner's rejection is to stand, one is to consider that it would have been obvious to apply the 1977 teaching of DiToro, which relates to dispersive systems, to the 1998 teaching of AAPA which is concerned with non-dispersive systems. Given that the present invention is in a fast moving and competitive field of technology, one wonders why it did not happen sooner!

5. By way of preparations for a possible Appeal, applicant summarizes its previous submission as follows. In the equalization method of DiToro, the message signal is received from a single antenna element and thus comprises a single, partitioned signal stream transmitted in burst or frame by frame form. Each frame comprises the message followed by a test signal. It is necessary in the method of DiToro to avoid overlapping the received message frames and the test signals due to the dispersion, i.e. time-spreading, encountered in the communications channel carrying the message frames and test signals. This is achieved by providing time gaps between the message frames and test signals (Abstract). The time gaps provided between the message frames and test signals are such that, notwithstanding the time-spread encountered in the transmission process, the bursts (message frames and test signals) do not overlap in time at the receiver (column 3, lines 59 to 66). In other words, the time gaps must be made sufficiently long to account for the maximum possible time-spread that may be encountered by the message frames and test signals in order to ensure that no overlapping of the bursts occurs at the receiver. This is an inefficient use of the communications channel.

6. In contrast, the present invention comprises a method (claim 1) of equalizing a data stream received over a dispersive communications channel from a plurality of transmit antenna elements, where said data stream is generated from a plurality of space time coded (STC) signals. It should be noted that space time signalling was

first mooted circa 1998. Space time coding (STC) and, in particular, space time transmit diversity (STTD) was proposed for mitigating the effects of fading and coloring of a non-dispersive communications channel (present application, page 2, line 30 to page 3, line 3). It is inherent in the arrangement of the invention that dispersion in the communications channel will result in time-overlapping of received signals and training sequences between the data streams and even within such streams. However, despite this, in the present invention it has been found to not be necessary to insert time gaps into the transmitted STC data streams as required by DiToro thus providing a useful advance over the combination of DiToro and AAPA.

7. The present invention therefore proposes using space time coding in a dispersive communications channel contrary to perceived wisdom in the field of STC and STTD in order to equalize a received signal. A skilled person would not seriously contemplate modifying the Applicant Admitted Prior Art (AAPA) which utilises STC in a non-dispersive communications channel with the equalization method disclosed in DiToro for a number of reasons. The equalization method of DiToro is applicable to a single, partitioned signal transmission over a dispersive communications channel in which time gaps are inserted between message frames and test signals. It is a straightforward process to determine the maximum possible time-spread that would be encountered by message frames and test signals in a communications channel carrying a single transmission signal and to then partition said transmission signal to insert time gaps sufficiently large to mitigate the effects of dispersion in the communications channel. However, in a dispersive, i.e. time-spreading, communications channel, it is inherent that simultaneous STC data streams received at a receiver will result in overlapping of message signals and training sequences at least between the data streams. This problem is exacerbated in an exponential fashion as the number of simultaneous STC data streams increases from two. Consequently, the insertion of time gaps into any or all of the streams will not prevent overlapping of message signals and training sequences. Therefore, a skilled person would not find motivation in DiToro to modify the AAPA

using the arrangement disclosed in DiToro to arrive at the method of the present invention in view of the apparent inability to insert effective time gaps into the plurality of STC data streams.


8. Applicant submits that it is only possible to arrive at the method of the present invention as defined by independent claim 1 starting with the AAPA and in view of DiToro through the impermissible use of hindsight.

9. The method of the present invention makes a useful contribution to the art of STC and STTD in that it provides a computationally simpler method of equalizing a communications channel than those conventionally employed in the art of STC and STTD and without the need to insert time gaps into transmitted data streams leading to slower processing times inherent in the process of DiToro.

10. The foregoing remarks are applicable to all independent claims of the present application. Consequently, it is considered that the claims of the present application define an invention that is patentable having regard to the AAPA in view of DiToro. Favorable reconsideration of the claims submitted herewith is respectfully requested.

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Respectfully submitted,

  
William M. Lee, Jr.  
Registration No. 26,935  
Barnes & Thornburg LLP  
P.O. Box 2786  
Chicago, Illinois 60690-2786  
(312) 214-4800  
(312) 759-5646 (fax)

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